

L 4212-66

ACCESSION NR: AP5025161

equations in this system are interdependent. Numerical integration must be used for solving even the simplest case where there are only two modes. However, some simplifying assumptions make it possible to obtain approximate solutions which can be used for analyzing fluctuations in the harmonic wave and for a qualitative evaluation of these fluctuations as a function of distance from the boundary in a nonlinear medium. Expressions are derived for the average power and dispersion of the harmonic. The most important result of the calculations is an analysis of nonhomogeneous dispersion of power fluctuations in the second harmonic which are caused by fluctuation phase scattering in the fundamental radiation. The results are true for any number of modes of the fundamental radiation. The behavior of nonhomogeneous dispersion in nonlinear processes of higher order should be similar: as the distance from the boundary of the medium  $l \rightarrow \infty$ , the fluctuations in boundary conditions disappear and a statistical relationship is established between the phases of the interacting waves. The calculations in the paper are limited to the quasi-static approximation which is most important for practical purposes. This approximation is true only when the difference in group lags for the interacting waves in the  $N\Delta\omega$  band can be disregarded. Otherwise an individual analysis is generally required. The results may also be used for analyzing time (spectral) characteristics of fluctuations in the power of the harmonic. Orig. art. has: 3 figures and 54 formulas. [14]

44 ASSOCIATION: Kafedra radiotekhniki Moskovskogo gosudarstvennogo universiteta (Radio Engineering Department, Moscow State University)  
Card 2/2

L 1212-66

ACCESSION NR: AP5025161

0

SUBMITTED: 02Jun64

ENCL: 00

SUB CODE: G-P

NO REF SOV: 008

OTHER: 008

ATD PRESS: 4121

Card 3/3 *DP*

L 26244-66 EEC(k)-2/EWA(h)/EWP(k)/EWT(l)/EWT(m)/FBD/T/EWP(e) IJP(c) WG/WH  
ACC NR: AP6014020 SOURCE CODE: UR/0056/66/050/004/0829/0853

AUTHOR: Akhmanov, S. A.; Kovrigin, A. I.; Chirkin, A. S.; Chunayev, O. N.

ORG: Moscow State University (Moskovskiy gosudarstvennyy universitet)

TITLE: Statistical effects associated with the generation of optical harmonics

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 50, no. 4, 1966, 829-843

TOPIC TAGS: laser, nonlinear optics, second harmonic, ruby laser

ABSTRACT: Results of an experimental and theoretical investigation of statistical effects appearing during generation of the second harmonic in optically transparent crystals are presented. It is established experimentally that under real conditions the correlation coefficient between the power of the second harmonic  $P_2$  and the square of the power of the fundamental radiation emitted by a solid state laser,  $P_1$ , differs from unity and that the proportionality factor  $K$  in the equation,  $P_2 = KP_1^2$ , is a random quantity. In order to explain these effects in the approximation of the field of fundamental radiation, a theory of generation of optical harmonics in the field of randomly modulated waves is developed which takes into account spatial as well as temporal incoherence of the fundamental radiation. The spatial dimensions characterizing the generation of optical harmonics by a bound, randomly modulated beam in an anisotropic medium are determined. It was found that the main

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ACC NR: AP6014020

3

sources of excess fluctuations of the second harmonic power are fluctuations of mode phases, mode number, and angular divergence of the fundamental radiation, generation of the optical harmonics being attained by means of ruby or neodymium glass lasers. Experiments on the generation of optical harmonics and mixing of frequencies by means of non-laser light sources are briefly discussed. It is noted that in this case spatial incoherence effects are important. Orig. art. has: 2 figures, 3 tables, and 47 formulas. [CS]

SUB CODE: 20/ SUBM DATE: 15May65/ ORIG REF: 015/ OTH REF: 010/ ATD PRESS:

4244

Card 2/2 CC

BOL'SHAKOV, K.A.; SOKOLOV, Ye.B.; FEDOROV, P.I.; CHIRKIN, A.V.

Study of the fusibility diagram of the germanium - calcium system by thermal analysis. Izv.AN SSSR.Neorg.mat. 1 no.10:1822-1825 0 '65. (MIRA 18:12)

1. Moskovskiy institut tonkoy khimicheskoy tekhnologii imeni M.V.Lomonosova. Submitted June 3, 1965.

GREBENNIKOV, R.V.; CHIRKIN, A.V.

Effect of the rates of crystallization and annealing on the plastic  
properties of high boron steel. Atom. energ. 18 no.6:644-646 Je '65.  
(MIRA 18:7)

L 39712-66 EWP(k)/EWT(m)/EWP(t) IJP(c) JD/JG/GD-2  
ACC NR: AP6007951 (N) SOURCE CODE: UR/0089/66/020/002/0144/0145

AUTHOR: Grebennikov, R. V.; Chirkin, A. V.; Pereverzeva, R. K.; Vukolova, V. H.;  
Demidov, P. I. 18  
B

ORG: none

TITLE: Effect of vanadium on the phase composition and structure of high-boron steel 18, 18

SOURCE: Atomnaya energiya, v. 20, no. 2, 1966, 144-145

TOPIC TAGS: boron steel, high boron steel, steel machinability, machinability improvement, boron containing steel, alloy steel, vanadium containing steel

ABSTRACT: The effect of vanadium on the structure and machinability of high-boron steels has been studied. These steels have a low plasticity and machinability caused by a high content of boron phase of the  $M_2B$  type. The amount of this phase can be reduced by promoting formation of borides containing more boron per unit volume than  $M_2B$ . Nine heats containing up to 0.02% carbon, 0.47-20.4% chromium, 0-17.83% nickel, 2.88-3.46% boron and 0-11.2% V were tested. It was found that in the presence of vanadium, in addition to  $M_2B$  boride, a tetragonal  $M_3B_2$  boride is formed whose quantity increases with increasing vanadium content. At 11% vanadium, the whole boride phase consists of  $M_3B_2$  and the volume of the boride phase decreases by approximately 10%. The steel containing 3-3.5% boron and 7-11% vanadium can be easily machined with standard cutting tools. Orig. art. has: 2 figures and 1 table. 18 [WW]

SUB CODE: 11/ SUBM DATE: 07Aug65/ OTH REF: 005/ ATD PRESS:  
Card 1/14/3/ UDC: 669.15:621.039

I 6354-66 EWI(1)/EWA(h)

ACC NR: AP5020370

SOURCE CODE: UR/0141/65/008/003/0569/0578

AUTHOR: Akhmanov, S. A.; Chirkin, A. S.

27  
B

ORG: Moscow State University (Moskovskiy gosudarstvennyy universitet)

TITLE: On detecting phase fluctuations in multiple mode generators operating in a nonlinear medium

SOURCE: IVUZ. Radiofizika, v. 8, no. 3, 1965, 569-578

TOPIC TAGS: <sup>AW</sup> phase measurement, phase shift analysis, harmonic oscillation, frequency discriminator

ABSTRACT: Fluctuation phenomena in multiple mode generators are discussed. The analysis covers the spectrum of second harmonic power fluctuations and the difference frequencies of the power fluctuation spectrum. The results show that nonlinear transformations can be used to discriminate between the uncorrelated phase fluctuations of different modes. In this case the envelope of the spectrum associated with phase fluctuations has a form which corresponds to the component of the mode spectral line. It is shown that the discrimination coefficient is inversely proportional to the width of the line so the proposed method is most convenient for narrow lines. It is also convenient for recording the phase fluctuations of continuous gas and semiconductor generators. The power values achieved for optical harmonics may be increased.

UDC: 53 : 519.25

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L 6354-66

ACC NR: AP5020370

ed substantially due to the large coherent lengths and the high power of basic radiation. A slightly modified form of the method may be used to investigate phase fluctuations in an integrated solid state generator. In this case when the pulse duration is greater than the correlation time for the phase fluctuations, the pulse shape of the second harmonic or of the difference frequency will be determined not only by the amplitudes, but also by the phases of the principal mode. The equations which have been derived may be useful in cases when the spectrum of the multiple mode generator is investigated by measuring the width of the beat spectrum between modes. "The authors thank I. L. Bershteyn who became thoroughly familiar with the manuscript and whose remarks were considered in the preparation of the final draft." Orig. art. has: 34 formulas, 2 figures.

SUB CODE: OP,EC/      SUBM DATE: 06Jul64/      ORIG REF: 009/      OTH REF: 011

Card 2/2 *l.d.s.*

ACC NR: AP7008270

SOURCE CODE: UR/0111/67/010/001/0116/0119

AUTHOR: Akhmanov, S. A.; Baklanova, V. V.; Chirkin, A. S.

ORG: Moscow State University (Moskovskiy gosudarstvennyy universitet)

TITLE: Parametric amplification with multi-mode pumping

SOURCE: IVUZ. Radiofizika, v. 10, no. 1, 1967, 146-149

TOPIC TAGS: parametric amplifier, laser effect, nonlinear optics,  
*OPTIC PUMPING*

ABSTRACT: A theoretical study was made of the effect of multi-mode pumping on the parametric amplification of traveling em waves. It was shown that those effects which do not fit into the theory of parametric amplification due to non-monochromatic pumping (e.g., lack of agreement between the experimented and calculated values of the parametric amplification and generation thresholds, decreased phase selectivity of "degenerate" parametric light amplifier, anomalous spectral broadening of amplified signal) may be explained if it is assumed that the pumping source used in practice is nonmonochromatic. The results indicate that in parametric processes this mode structure of the pumping source may considerably effect quantitative values. When used in the study of the processes of stimulated scattering of modulated emission, the proposed

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UDC: 621.375.931

ACC NR:AP7008270

method yields sufficiently general quantitative results. Orig. art. has:  
2 figures and 13 formulas.

[WA-14]  
[JM]

SUB CODE: 20/ SUBM DATE: 6Apr66/ ORIG REF: 006/ OTH REF: 006

Card 2/2

ACC NR: AP6036795

SOURCE CODE: UR/0363/66/002/011/2064/2066

AUTHOR: Andrianov, V. G.; Bol'shakov, K. A.; Sokolov, Ye. B.; Chirkin, A. V.;  
Fedorov, P. I.

ORG: Moscow Institute of Fine Chemical Technology im. M. V. Lomonosov (Moskovskiy  
institut tonkoy khimicheskoy tekhnologii)

TITLE: Thermal analysis of the germanium-barium phase diagram

SOURCE: AN SSSR. Izvestiya. Neorganicheskiye materialy. v. 2, no. 11, 1966, 2064-2066

TOPIC TAGS: germanium barium alloy, alloy phase diagram, alloy ~~phase~~ composition,  
alloy structure, alloy system, germanium alloy, barium alloy, thermal analysis

ABSTRACT: A phase diagram of the germanium-barium system (Fig. 1) was plotted on the  
basis of data obtained by thermal analysis of 34 alloys containing 0 to 100% barium.  
It was found that the system includes three compounds:  $BaGe$ ,  $BaGe_2$ , and  $Ba_2Ge$  whose  
melting temperatures are 1145, 1050 and 940C, respectively. All compounds have high  
hardness and are unstable when exposed to air, particularly those with a high barium  
content, which rapidly decompose and turn into a yellow-brown powder.  $BaGe_2$  was the  
most stable compound. It has a cubic lattice  $a = 14.52 + 0.03A$ . Orig. art. has:  
1 figure and 1 table.

SUB CODE: 11/ SUBM DATE: 08Jan66/ ORIG REF: 003/ OTH REF: 005/

UDC: 546.3-19-289-43:620.181.4

Card 1/2

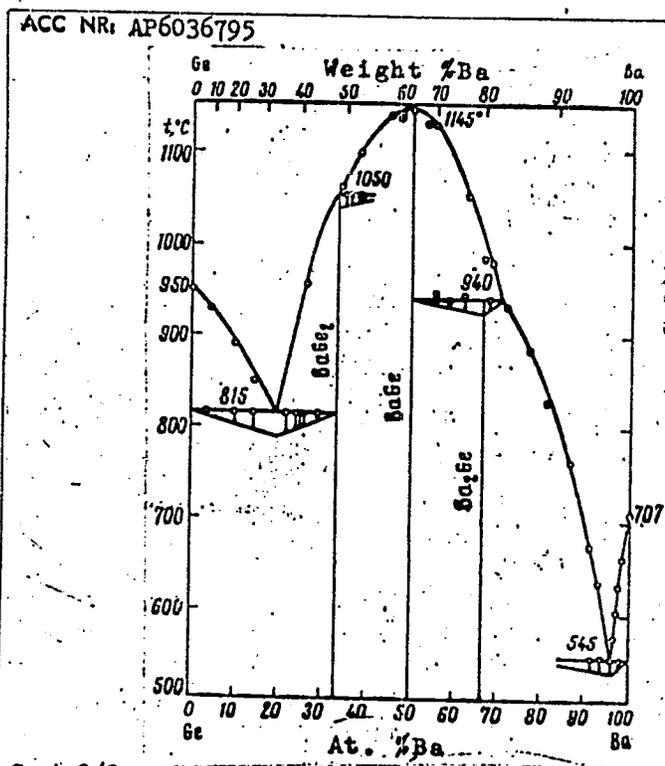


Fig. 1. Phase diagram of the germanium-barium system.

Card 2/2

CHIRKIN, B.V., inzh.

Fire-fighting system on the motorship "Sretensk." Biul. tekhn. ekon.  
inform. Tekhn. upr. Min. mor. flota 7 no. 6:56-60 '62.  
(MIRA 16:4)

(Ships—Fires and fire prevention)

CHIRKIN, B., elektromekhanik

Centralization and automation in the operation of auxiliary  
machines. Mor. flot 23 no.4:22-24 Ap '63. (MIRA 16:5)

1. Teplokhod "Sretensk" Baltiyskogo parokhodstva.  
(Marine engineering) (Automation)

CHIRKIN, B., inzh., elektromekhanik

Power engineering on ships of the future. Mor. flot 23 no.10:  
33-34 0 '63. (MIRA 16:10)

1. Teplokhod "Sretensk" Baltiyskogo parokhodstva.  
(Thermoelectric generators) (Electricity on ships)

CHIRKIN, B., elektromekhanik

Causes of the breakdown of the generator no.1 on the "Archangel"  
class ships. Mor. flot 25 no.4:23-24. Ap '65.

1. Teplokhod "Sretensk".

(MIRA 18:6)

CHIRKIN, B.V., inzh.

Using a system of centralized starting of electric motors.  
Sudostroenie 30 no.9:35-37 S '64. (MIRA 17.11)

CHIRKIN, F., prepodavatel'

Young innovators are growing up. Prof.-tekh. obr. 20 no.9:  
15-16 B. '63. (MIRA 16:11)

USSR / Human and Animal Physiology. Blood Chemistry.

T

Abs Jour : Ref Zhur - Biol., No 15, 1958, No. 69973

Author : Chirkov, E. A.  
Inst : Buryat-Mong. Institute of Veterinary Medicine  
Title : Changes in Biochemical Indices of the Blood of Horses  
Following Physical Exertion

Orig Pub : Tr. Buryat-Mong. zoovet. in-ta, 1956, No 10, 117-120

Abstract : Studies were made of the biochemical indices of the blood in two horses following a quick run of two kilometers pulling a load of 85 kg and in six horses which had trotted two kilometers pulling a load of 40 kg. The total protein of the blood was not detectably changed; the content of albumen declined, however; the A/G ratio decreased by 16 percent. Following running with a load the blood sugar level was greater than at rest by 41 percent, while following trotting, the increase was only 12 percent. The level

Card 1/2

CHIRKIN, G.; TISHCHENKO, D.

Redox reactions in alkali cooking of wood. Zhur.prikl.khim. 35 no.1:  
153-159 Ja '62. (MIRA 15:1)

1. Lesotekhnicheskaya akademiya imeni S.M.Kirova.  
(Oxidation-reduction reactions) (Woodpulp)

BIL'DYUKEVICH, A.L.; VINOKUROV, V.M.; ZARIPOV, M.M.; POL'SKIY, Yu.Ye.;  
STEPANOV, V.G.; CHIRKIN, G.K.; SHEKUN, L.Ya.

Electron paramagnetic resonance in andalusite. Zhur. eksp. i  
teor. fiz. 39 no. 6:1548-1551 D '60. (MIRA 14:1)

1. Kazanskiy gosudarstvennyy universitet.  
(Paramagnetic resonance and relaxation)  
(Andalusite)

CHIRKIN, G. K.

27299

S/181/61/003/003/029/034  
B111/B102

24,7900

AUTHORS: Vinokurov, V. M., Zaripov, M. M., Stepanov, V. G., Pol'skiy, Yu. Ye., Chirkin, G. K., and Shokun, L. Ya.

TITLE: Electron paramagnetic resonance in natural chrysoberyl

PERIODICAL: Fizika tverdogo tela, v. 3, no. 8, 1961, 2475 - 2479

TEXT: The electron paramagnetic resonance spectrum of the  $Fe^{3+}$  ions which substituted isomorphically the  $Al^{3+}$  ions in  $Al_2BeO_4$  was investigated. Measurements were made of triple, double, and single crystals at room temperature, at,  $(7 - 51) \cdot 10^9$  cps, and in magnetic fields of up to 20 kilogauss. Nuclear resonance of hydrogen, deuterium, and lithium was used to measure the field strength. The single crystals were placed in a cylindrical  $H_{111}$  resonator, and their natural faces (100) on its bottom. It could be changed by an angle of  $360^\circ$  in that plane. For studying the angular dependence of the e.p.r. spectrum between  $10 \cdot 10^9$  and  $20 \cdot 10^9$  cps a  $H_{011}$

Card 1/4

27299

S/181/61/003/008/029/034  
B111/B102

Electron paramagnetic resonance...

resonator was used. The crystal in it could rotate around an axis perpendicular to the resonator's axis. The magnet rotated together with it by 360°. The measurements showed that the angular dependence of the e.p.r.

spectrum was due to paramagnetic atoms substituting the Al<sup>3+</sup> ions. The direction c was found to be one of the main directions of the electric field in the crystal acting on the paramagnetic ion. Whilst the existence of four magnetically nonequivalent, pairwise identical complexes was expected from X-ray diffraction studies, investigations of the e.p.r. spectra indicated the existence of only two identical complexes oriented in opposite directions. The orientations of the other two include an angle of about 70°. The authors attempt to explain this divergence by the assumption that the Al<sup>3+</sup> ions are

replaced by Fe<sup>3+</sup> only in those complexes (II and IV in Fig. 1) in which the Al<sup>3+</sup> ions are arranged symmetrically around the O<sup>2-</sup> ions. If one considers

only the neighborhood of the substituting Fe<sup>3+</sup> ions, they seem to be subjected to an almost cubically symmetric electric field. It is, however, shown that the spectrum observed can be described by a Hamiltonian of lower (rhombical) symmetry. This fact is explained by the assumption that the atoms farther

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Electron paramagnetic resonance...

27292  
S/181/61/003/008/029/034  
B111/B102

from the  $Fe^{3+}$  ions which are arranged in rhombical symmetry have a significant influence upon the crystal field. Only in a few cases  $Al^{3+}$  ions in octahedral sites (I and III, Fig. 1) are substituted by  $Fe^{3+}$  ions. V. D. Kolomenskiy and V. G. Kuznetsov are thanked for having supplied specimens, D. Kh. Dinmukhametov and R. M. Mineyev for their assistance in calculations, and S. A. Al'tshuler for discussions. There are 3 figures, and 4 references: 1 Soviet-bloc and 3 non-Soviet-bloc.

ASSOCIATION: Kazanskiy gosudarstvennyy universitet im. V. I. Ul'yanova-Lenina (Kazan' State University imeni V. I. Ul'yanov-Lenin)

SUBMITTED: April 5, 1961

Card 3/4

CHIRKIN, G.K.

24.7900

36172  
S/181/62/004/003/012/045  
B102/B104

AUTHORS: Vinokurov, V. M., Zaripov, M. M., Stepanov, V. G., Pol'skiy, Yu. Ye., Chirkin, G. K., and Shokun, L. Ya.

TITLE: Paramagnetic resonance of trivalent chromium in andalusite

PERIODICAL: Fizika tverdogo tela, v. 4, no. 3, 1962, 646 - 649

TEXT: In  $Al_2SiO_5$  there are two magnetically non-equivalent types of  $Cr^{3+}$  ions: the z-axes of both lie in the ab plane but diverge by an angle of  $77^\circ$ , the y-axes lie in the same plane, the x-axes coincide with the direction of the c-axis of the crystal. The z-axes of the  $Fe^{3+}$  ions diverge by  $57.8^\circ$ , the angle between the z-axes of the first types of  $Fe^{3+}$  and  $Cr^{3+}$  ions is  $22.6^\circ$ . The  $Cr^{3+}$  electron paramagnetic resonance in  $Al_2SiO_5$  was measured at 9431 Mcps. The angular dependence of the resonance field was determined for the transition  $M = -3/2 \rightarrow -1/2$  ( $M$  - magnetic quantum number). For  $\vec{H} \parallel z$ ,  $g_{eff} \approx 2$ , for  $\vec{H} \parallel x$  and  $\vec{H} \parallel y$ ,  $g_{eff} \approx 4$ , i. e. the initial splitting

Card 1/2

Paramagnetic resonance ...

S/181/62/004/003/012/045  
B102/B104

$\delta$  of the spin quadruplet of  $\text{Cr}^{3+} > 10^{10}$  cps. The resonance values of H do not coincide for  $\vec{H} \parallel x$  and  $\vec{H} \parallel y$ . The spin Hamiltonian is

$$\mathcal{H} = D \left[ S_z^2 - \frac{1}{3} S(S+1) \right] + E(S_x^2 - S_y^2) + \beta (g_x H_x S_x + g_y H_y S_y + g_z H_z S_z) \quad (1)$$

its constants are:  $S=3/2$ ,  $g_{||} = 1.976$ ,  $g_{\perp} = 1.985$ ,  $D = 15.95 \cdot 10^9$  cps,  $E = 0.60 \cdot 10^9$  cps. The initial splitting  $\delta$  is  $(32.0 \pm 0.1) \cdot 10^9$  cps, which agrees well with the theoretical value ( $\delta = 2 \sqrt{D^2 + 3E^2} = 31.97 \cdot 10^9$  cps). O. I. Mar'yakhina is thanked for help and S. A. Al'tshulor for interest. There are 3 figures and 3 references: 1 Soviet and 2 non-Soviet. The English-language references are: R. W. G. Wyckoff, Crystal Structure, II, 1951; A. Abragam M. H. L. Pryce, Proc. Roy. Soc. A205, 135, 1951.

ASSOCIATION: Kazanskiy gosudarstvennyy universitet imeni V. I. Ul'yanova-Lenina (Kazan' State University imeni V. I. Ul'yanov-Lenin)

SUBMITTED: October 16, 1961  
Card 2/2

CHIRKIN, G.K.

24.7900

3/181/62/004/003/012/045  
B102/B104

AUTHORS: Vinokurov, V. M., Zaripov, M. M., Stepanov, V. G., Pol'okiy, Yu. Ye., Chirkin, G. K., and Shekun, L. Ya.

TITLE: Paramagnetic resonance of trivalent chromium in andalusite

PERIODICAL: Fizika tverdogo tela, v. 4, no. 3, 1962, 646 - 649

TEXT: In  $Al_2SiO_5$  there are two magnetically non-equivalent types of  $Cr^{3+}$  ions: the z-axes of both lie in the ab plane but diverge by an angle of  $77^\circ$ , the y-axes lie in the same plane, the x-axes coincide with the direction of the c-axis of the crystal. The z-axes of the  $Fe^{3+}$  ions diverge by  $57.6^\circ$ , the angle between the z-axes of the first types of  $Fe^{3+}$  and  $Cr^{3+}$  ions is  $22.6^\circ$ . The  $Cr^{3+}$  electron paramagnetic resonance in  $Al_2SiO_5$  was measured at 9431 Mops. The angular dependence of the resonance field was determined for the transition  $M = -3/2 \rightarrow -1/2$  ( $M$  - magnetic quantum number). For  $\vec{H} \parallel z$ ,  $\epsilon_{eff} \approx 2$ , for  $\vec{H} \parallel x$  and  $\vec{H} \parallel y$ ,  $\epsilon_{eff} \approx 4$ , i. e. the initial splitting

Card 1/2

S/101/62/004/003/012/045  
B102/B104

Paramagnetic resonance ...

$\delta$  of the spin quadruplet of  $\text{Cr}^{3+} > 10^{10}$  cps. The resonance values of H do not coincide for  $\vec{H} \parallel x$  and  $\vec{H} \parallel y$ . The spin Hamiltonian is

$$\mathcal{H} = D \left[ S_z^2 - \frac{1}{3} S(S+1) \right] + E(S_x^2 - S_y^2) + \beta (g_x H_x S_x + g_y H_y S_y + g_z H_z S_z) \quad (1)$$

its constants are:  $S=3/2$ ,  $g_y = 1.976$ ,  $g_x = 1.985$ ,  $D = 15.95 \cdot 10^9$  cps,  $E = 0.60 \cdot 10^9$  cps. The initial splitting  $\delta$  is  $(32.0 + 0.1) \cdot 10^9$  cps, which agrees well with the theoretical value ( $\delta = 2 \sqrt{D^2 + 3E^2} = 31.97 \cdot 10^9$  cps).

O. I. Mar'yakhina is thanked for help and S. A. Al'tahular for interest. There are 3 figures and 3 references: 1 Soviet and 2 non-Soviet. The English-language references are: R. W. G. Wyckoff, Crystal Structure, II, 1951; A. Abragam M. H. L. Pryce, Proc. Roy. Soc. A205, 135, 1951.

ASSOCIATION: Kazanskiy gosudarstvennyy universitet imeni V. I. Ul'yanova-Lenina (Kazan' State University imeni V. I. Ul'yanov-Lenin)

SUBMITTED: October 16, 1961  
Card 2/2

VINOKUROV, V.M.; ZARIPOV, M.M.; POL'SKIY, Yu.Ye.; STEPANOV, V.G.;  
CHIRKIN, G.K.; SHEKUN, L.Ya.

Studying the isomorphous features of  $Fe^{3+}$  ions in andalusite by  
the paramagnetic resonance method. Kristallografiia 7 no.2:  
318-320 Mr-Apr '62. (MIRA 15:4)

1. Kazanskiy gosudarstvennyy universitet imeni Ul'yanova-Lenina.  
(Andalusite) (Paramagnetic resonance and relaxation)

VINOKUROV, V.M.; ZARIPOV, M.M.; STEPANOV, V.G.; FOL'SKIY, Yu.Ye.; CHIRKIN,  
G.K.; SHEKUN, L.Ya.

Paramagnetic resonance of trivalent chromium in andalusite. Fiz.  
tver. tela 4 no.3:646-649 '62. (MIRA 15:4)

1. Kazanskiy gosudarstvennyy universitet imeni V.I.Ul'yanova-Lenina.  
(Paramagnetic resonance and relaxation) (Chromium) (Andalusite)

VINOKUROV, V.M.; ZARIPOV, M.M.; POL'SKIY, Yu.Ye.; STEPANOV, V.G.;  
CHIRKIN, G.K.; SHEKUN, L.Ya.

Electron paramagnetic resonance of  $Gd^{3+}$  and  $CaF_2$ .  
Fiz. tver. tela 4 no.8:2238-2242 Ag '62. (MIRA 15:11)

1. Kazanskiy gosudarstvennyy universitet imeni  
V.I. Ul'yanova-Lenina.  
(Paramagnetic resonance and relaxation)  
(Gadolinium)  
(Calcium fluoride)

ARKHANGEL'SKAYA, Ye.D.; ZARIPOV, M.M.; POL'SKIY, Yu.Ye.; STEPANOV, V.G.;  
~~CHIRKIN, G.K.~~; SHEKUN, L.Ya.

Electron paramagnetic resonance of  $\text{Cr}^{3+}$  in  $\text{K}_2\text{Zn}(\text{SO}_4)_2 \cdot 6\text{H}_2\text{O}$ .  
Fiz. tver. tela 4 no.9:2530-2533 S '62. (MIRA 15:9)

1. Kazanskiy gosudarstvennyy universitet imeni V.I. Ul'yanova-Lenina.

(Paramagnetic resonance and relaxation)  
(Tutton's salts)

VINOGRADOV, V.M.; ZARIPOV, M.M.; POL'SKIY, Yu.Ye.; STEPANOV, V.G.; CHIRKIN, G.K.;  
SHEKUN, L.Ya.

Electron paramagnetic resonance of  $Gd^{+3}$  in  $CaF_2$ . Fiz. tver. tela  
5 no.2:599-604 F '63. (MIRA 16#5)

1. Kazanskiy gosudarstvennyy universitet imeni V.I.Ul'yanova-Lenina.  
(Paramagnetic resonance and relaxation) (Gadolinium)  
(Calcium fluoride)

L 13679-63

EWT(1)/EWP(q)/EWT(m)/EDS/EEC(b)-2 AFFTC/ASD/ESD-3 GG/JD/IJP(G)

ACCESSION NR: AP3003893

S/0181/63/005/007/1936/1939

AUTHOR: Vinokurov, V. M.; Zaripov, M. M.; Stepanov, V. G.; Chirkin, G. K.;  
Shekun, L. Ya.69  
67TITLE: Electron paramagnetic resonance of  $\text{Eu}^{2+}$  ions in  $\text{BaF}_2$  and  $\text{SrF}_2$  monocrystals

SOURCE: Fizika tverdogo tela, v. 5, no. 7, 1963, 1936-1939

TOPIC TAGS: electron paramagnetic resonance, europium-doped fluoride, europium hyperfine structure, EPR measurement, barium fluoride, strontium fluoride, calcium fluoride

ABSTRACT: Experiments have been carried out with 0.05% Eu ions in the cubic symmetry field of  $\text{BaF}_2$  and  $\text{SrF}_2$  crystals at a frequency of approximately 40 kmc. In the case of a parallel field, the EPR spectral groups represent the superposition of two equidistant hyperfine structure sextets. The width of the individual hyperfine components is a few oersteds, and the sextet centers coincide within 1 oe. The Hamiltonian constants determined from the measurements are tabulated and compared with analogous constants found in the literature for  $\text{CaF}_2$ . The variation in the hyperfine-structure constants is found to be within the limits of experimental error. In the case of nonparallel magnetic fields, additional lines

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L 13679-63

ACCESSION NR: AP3003893

2

appeared between the usual hyperfine components, due to the transition  $\Delta M = \pm 1$ ,  $\Delta m = \pm 1$ . The appearance of additional lines is remarkable, since the fine structure is small in comparison to Zeeman energy. Computation of the intensity of the additional lines shows that even with  $H = 1.4 \times 10^4$  oer and a field angle of  $\pi/8$  the intensities of the additional and fundamental lines are comparable. "We express our thanks to P. P. Feofilov who directed our attention to these materials and kindly provided specimens for investigation." Orig. art. has: 5 formulas and 1 table.

ASSOCIATION: Kazanskiy gosudarstvennyy universitet im. V. I. Ul'yanova-Lenina  
(Kazan State University)

SUBMITTED: 06Mar63

DATE ACQ: 15Aug63

ENCL: 00

SUB CODE: PH

NO REF SOV: 001

OTHER: 003

Card 2/2

L 13808-63 EWT(1)/EWP(1)/EWT(1)/HDS APPTG/ASD PI-4 GG/IJP(C)/JD/JG  
ACCESSION NR: AP3003916

S/0181/63/005/007/2034/2035

68  
66

AUTHOR: Vinokurov, V. M.; Zaripov, M. N.; Stepanov, V. G.; Chirkov, G. K.;  
Shekun, L. Ya.

TITLE: Paramagnetic resonance of Nb<sup>4+</sup> ions in zircon monocrystals 21

SOURCE: Fizika tverdogo tela, v. 5, no. 7, 1963, 2034-2035

TOPIC TAGS: zircon, zirconium, niobium ion, niobium zircon spectrum, impurity  
spectrum, Nb EPR spectrum, niobium zircon EPR

ABSTRACT: A characteristic spectrum of ten lines, equal in intensity and practically equidistant, has been observed in a ZrSiO<sub>4</sub> monocrystal at 77K. Measurements showed that the positions of all ten lines can be described by a spin Hamiltonian with  $S = 1/2$  and  $I = 9/2$ . The parallel g-factor is  $1.862 \pm 0.001$ , and the perpendicular g-factor is  $1.908 \pm 0.001$ . The authors conclude that these lines are due to the Nb<sup>4+</sup> ion replacing the Zr ion in the lattice, since the spin of the Nb<sup>93</sup> nucleus is  $9/2$ , niobium is present in natural zircon, and the parameters of the spin Hamiltonian described above are close to those describing the Nb<sup>4+</sup> spectrum in glass. Furthermore, Nb<sup>4+</sup> resembles Ti<sup>3+</sup> and V<sup>4+</sup> in its magnetic properties, and the specific spectral features of the Nb ion in

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L 13808-63

ACCESSION NR: AP3003916

zircon are characteristic of the patterns displayed in the case of Ti and V ions situated in low-symmetry electric fields. "We express our sincere gratitude to N. S. Garif'yanov for evaluating the results of our work." Orig. art. has: 1 formula and 1 figure. 2

ASSOCIATION: Kazanskiy gosudarstvennyy universitet im. V. I. Ul'yanova-Lenina (Kazan State University)

SUBMITTED: 18Mar63

DATE ACQ: 15Aug63

ENCL: 00

SUB CODE: PE

NO REF SOV: 005

OTHER: 004

Card 2/2

VINOKUROV, V.M.; ZARIPOV, M.M.; STEPANOV, V.G.; CHIRKIN, G.K.; SHEKUN, L.Ya.

Electron paramagnetic resonance of  $\text{Eu}^{2+}$  ions in  $\text{BaF}_2$  and  $\text{SrF}_2$  single crystals. Fiz. tver. tela 5 no.7:1936-1939 JI '63.  
(MIRA 16:9)

1. Kazanskiy gosudarstvennyy universitet imeni V.I.Ul'yanova-Lenina.  
(Paramagnetic resonance and relaxation—Spectra)  
(Barium fluoride) (Strontium fluoride)

VINOKUROV, V.M.; ZARIPOV, M.M.; POL'SKIY, Yu.Ye.; STEPANOV, V.G.; CHIRKIN,  
G.K.; SHEKUN, L.Ya.

Electron paramagnetic resonance of  $Gd^{3+}$  in  $CaF_2$ . Fiz. tver. tela  
5 no.10:2902-2907 0 '63. (MIRA 16:11)

1. Kazanskiy gosudarstvennyy universitet im. V.I. Ul'yanova-  
Lenina.

ACCESSION NR: AP4039647

S/0181/64/006/006/1645/1648

AUTHORS: Zaripov, M. M.; Chirkin, G. K.

TITLE: Investigation of the electron paramagnetic resonance spectrum of  $\text{Cu}^{2+}$  in  $\text{NH}_4\text{Cl}$

SOURCE: Fizika tverdogo tela, v. 6, no. 6, 1964, 1645-1648

TOPIC TAGS: electron paramagnetic resonance, unit cell, excess charge, g factor, spin orbit constant, crystal structure, crystal lattice, doublet, intercrystalline electric field, spin Hamiltonian

ABSTRACT: The authors investigated the electron paramagnetic resonance spectrum of  $\text{Cu}^{2+}$  in  $\text{NH}_4\text{Cl}$  at frequencies of the order of 40 kilomegacycles at a temperature of 77K. They observed the spectrum and studied its angular variation for single crystals grown from a parent solution having the proportion of  $\text{Cu}^{2+} : \text{NH}_4\text{Cl} = 1 : 10^4$ . The studies showed the presence of three magnetically nonequivalent  $\text{Cu}^{2+}$  ions. The axis of the intercrystalline electric field was oriented along the cube  
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ACCESSION NR: AP4039647

edge of the unit cell. From these studies the authors proposed a hypothesis for the mechanism of penetration of the  $\text{Cu}^{2+}$  ions into the  $\text{NH}_4\text{Cl}$  lattice and analyzed the g factor and the spin orbit interaction constant. Experimental values are given by the two sets of coefficients

$$\begin{array}{l} c_1 = 0.7736, \quad c_2 = 0.0894, \quad c_3 = 0.6274; \\ c_1 = 0.7082, \quad c_2 = 0.7011, \quad c_3 = 0.0825. \end{array} \quad (1)$$

and g is given by

$$\begin{array}{l} g_{\parallel} = 2(3c_1^2 - c_2^2 - 2c_3^2); \\ g_{\perp} = 4c_1(c_2 + c_3). \end{array} \quad (2)$$

Orig. art. has: 7 formulas.

ASSOCIATION: Kazanskiy gosudarstvennyy universitet im. V. I. Ul'yanova-Lenina  
(Kazan State University)

SUBMITTED: 09Dec63

DATE ACQ: 19Jun64

ENCL: 00

SUB CODE: IC

NO REF SOV: 003

OTHER: 005

Card 2/2

ACCESSION NR: AP4041701

S/0181/64/006/007/2014/2016

AUTHORS: Antipin, A. A.; Kurkin, I. N.; Chirkin, G. K.; Shekun,  
L. Ya.

TITLE: Electron paramagnetic resonance of  $Ce^{+++}$  ions interpenetrated  
in single crystals of  $SrF_2$  and  $BaF_2$

SOURCE: Fizika tverdogo tela, v. 6, no. 7, 1964, 2014-2016

TOPIC TAGS: electron paramagnetic resonance, single crystal, spec-  
tral analysis, barium compound, strontium compound, tetragonal  
system, cerium

ABSTRACT: To provide a comparison with results obtained by optical  
tests, the authors investigated the EPR of  $SrF_2$  and  $BaF_2$  single  
crystals containing about 0.5%  $Ce^{3+}$ , at 4.2K and a frequency close  
to 9 Gc/sec. In view of the closeness of the results to those ob-  
tained by Baker et al. for  $CaF_2$  (Proc. Phys. Soc. v. 73, 942, 1959),

Card 1/3

ACCESSION NR: AP4041701

it is concluded that spectral characteristics of magnetic centers with tetragonal symmetry were observed for both host substances. Satellite lines analogous to those observed in  $\text{CaF}_2$  were observed. The g-factors were determined by using the position of the DPPH line at liquid helium temperature. The values obtained for  $\text{CaF}_2$ ,  $\text{SrF}_2$ , and  $\text{BaF}_2$  were 0.834, 0.829, and 0.825, respectively. It is suggested that the g-factor of the free ion is closer to 0.825 than to the ideal Russel-Saunders value  $6/7 = 0.856$ . The reason for this is that the crystal field adds states with  $J = 5/7$  to the ground state  $J = 5/2$ . "In conclusion we thank P. P. Feofilov for supplying the cerium activated  $\text{SrF}_2$  and  $\text{BaF}_2$ ." Orig. art. has: 7 formulas.

ASSOCIATION: Kazanskiy gosudarstvennyy universitet im. V. I. Ul'yanova-Lenina (Kazan' State University)

Card 2/3

ZARIPOV, M.M.; CHIRKIN, G.K.

Electron paramagnetic resonance spectra and the structure of the  
immediate environment of paramagnetic ions in  $\text{NH}_4\text{Cl}$ . Fiz. tver.  
tela. 7 no.10:2947-2951 O '65. <sup>4</sup> (MIRA 18:11)

1. Kazanskiy gosudarstvennyy universitet imeni Ul'yanova-Lenina.

L 25116-65 EWT(1)/EWT(m)/T/EWP(t)/EWP(b) IJP(c) CG/JD

ACCESSION NO. AP5033419

S/O18./65/00

AUTHORS: Jarapov, M. M.; Chirkin, G. K.

TITLE: Electron paramagnetic resonance of the iron-ions in  
single crystals of ammonium chloride

SOURCE: Fizika tverdogo tela, v. 7, no. 1, 1965, 166

TOPIC TAGS: electron paramagnetic resonance, spin Ham  
ammonium chloride, single crystal, charge compensation

**ABSTRACT:** This article is a continuation of earlier work (ZhFKh v. 5, 36, 1964; FTT v. 8, 1645, 1964) of EPR of ions in fields of tetragonal symmetry, and reports results of EPR spectra of  $Cu^{2+}$  and  $Fe^{3+}$  in an electric field of tetragonal symmetry and of  $Ni^{2+}$ ,  $Co^{2+}$ ,  $Fe^{3+}$ , and  $Fe^{2+}$  in fields of tetragonal symmetry. The host substance was single-crystal sal-ammonia.

Card 1/3

L 25112 -

ACCESSION NO. AP9203419

measurements were made at frequencies close to 36 G. Measurements of  $\text{Cu}^{2+}$  at 77K have shown that there are three magnetically non-equivalent  $\text{Cu}^{2+}$  ions and three  $\text{Ni}^{2+}$  non-equivalent ions. No spectrum was observed at room temperature or 77K for  $\text{Fe}^{3+}$ . At 4.2K the spectrum consisted of three groups of eight lines corresponding to three magnetically non-equivalent  $\text{Cu}^{2+}$  ions. A single line was observed for  $\text{Fe}^{2+}$  at 77K. The spectrum at 77K for  $\text{Fe}^{3+}$  was standard. The Hamiltonians and the hyperfine constants were determined for some of the ions. It is shown that the compensation of the excess charge of the  $\text{Cu}^{2+}$  and  $\text{Ni}^{2+}$  is effected along the two-fold axis and in the case of  $\text{Ni}^{2+}$  and  $\text{Fe}^{3+}$  the compensation is along the four-fold axis. Hamiltonian constants were determined for the ions  $\text{Cu}^{2+}$ ,  $\text{Ni}^{2+}$  and  $\text{Fe}^{3+}$ .

Cord 2/3

L 25116-65

ACCESSION NUMBER: AP5003419

Co<sup>2+</sup> ... has: 4 formulas.

ASSOCIATION: (Karamsky gosudarstvennyy universitet im.  
Vladimir Lenina (Karamsky State University))

SUBMITTED: 1965

ENCL: 00

SUB CODE:

NR REF SOV: 003

OTHER: 000

Cord

3/3

L 22103-66 EWT(1) IJP(c) WW/GG

ACC NR: AP6012938

SOURCE CODE: UR/0120/65/000/002/0202/0204

AUTHOR: Shvets, A. D.; Antipin, A. A.; Kirillov, Ye. I.; Stepanov, V. G.; Chirkin, G. K.

49  
B

ORG: Physicotechnical Institute, AN UkrSSR (Fiziko-tehnicheskij institut AN UkrSSR); Kazan' State University (Kazanskiy gosudarstvennyy universitet)

TITLE: Low temperature device for studying EPR

SOURCE: Pribory i tekhnika eksperimenta, no. 2, 1965, 202-204

TOPIC TAGS: electron paramagnetic resonance, cryogenic device, crystallography

ABSTRACT: A device is described and diagrammed which is designed to study electron paramagnetic resonance in the 8 mm wavelength range in crystals at low temperatures, down to 0.314° K. For the experiments, the sample under study is attached to a column in a millimeter band resonator, attached at two places to a thin-walled stainless steel tube 16 mm in diameter. The resonator is tuned by moving Melchior waveguides, a communicating diaphragm, and piston. The resonator, column, piston, and diaphragm are made of silvered brass. The lowest temperature is obtained by evacuation of vapor over liquid He<sup>3</sup> with an adsorption pump. Orig. art. has: 1 figure. [JPRS]

SUB CODE: 20 / SUBM DATE: 27Jul64 / ORIG REF: 001

Card 1/1 BNG

UDC: 536.483

26621-06 ENT(l)/LWT(m) IJP(c) JD/NA/GG

ACC NR: AP5025370

SOURCE CODE: UR/0181/65/007/010/2947/2951

AUTHOR: Zaripov, M. M.; Chirkin, G. K.

ORG: Kazan' State University im. V. I. Ul'yanov-Lenin (Kazanskiy gosudarstvennyy universitet)

TITLE: Electron paramagnetic resonance spectra of the nearest surroundings of paramagnetic ions in ammonium chloride

SOURCE: Fizika tverdogo tela, v. 7, no. 10, 1965, 2947-2951

TOPIC TAGS: EPR spectrum, paramagnetic ion, ammonium chloride, *temperature dependence*

ABSTRACT: A study was conducted of the temperature dependence of electron paramagnetic resonance spectrum of the "tetragonal" ions  $Mn^{2+}$  and  $Cu^{2+}$ . The temperature dependence of the fine  $b_2^0$  structure constant for  $Mn^{2+}$  is qualitatively explained by the change of the lattice constant ammonium chloride. The negative sign of  $b_2^0$ , an analysis of g-factors of  $Cu^{2+}$ ,  $Ni^{2+}$ ,  $Co^{2+}$  and the hyperfine structure constant of  $Cu^{2+}$  indicate that the bivalent paramagnetic ions are located in the octahedral surroundings formed by the four  $Cl^-$  ions and the two

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25621-56

ACC NR: AP5025370

$H_2O$  molecules. They are arranged in the center of a common grain of adjacent unit cells of  $NH_4Cl$  in which the vacancies of  $NH_4^+$  are replaced by water molecules. This model clarified the observation of the "rhombic"  $Cu^{2+}$  ions. The strong tetragonal component of the electrical field causes a great amount of spallation of the ground state of  $Mn^{2+}$  and  $Ni^{2+}$ , and also the observation of an electron paramagnetic resonance spectrum of  $Fe^{2+}$  at 77K. Orig. art. has: 2 fig., 3 tables, 1 formula.

SUB CODE: 20/ SUBM DATE: 05Apr65/ ORIG REF: 006/ OTH REF: 006

Card 2/2 *fw*

I 8976-66 EWT(1)/EWT(m)/EPP(n)-2/EWP(t)/EWP(h) IJP(c) JD/MH/OG

ACC NR: AP5027425

SOURCE CODE: UR/0181/65/007/011/3409/3410

AUTHOR: <sup>44, 55</sup>Zaripov, M. M.; <sup>44, 55</sup>Chirkov, G. K.

ORG: <sup>44, 55</sup>Kazan State Institute im. V. I. Ul'yanov-Lenin (Kazanskiy gosudarstvennyy uni-versitet) 56  
B

TITLE: <sup>21, 44, 55</sup>Electron paramagnetic resonance and second order phase transitions in ammonium chloride

SOURCE: Fizika tverdogo tela, v. 7, no. 11, 1965, 3409-3410

TOPIC TAGS: EPR, <sup>27</sup>ammonium compound, <sup>27</sup>chloride, second order phase transition

ABSTRACT: The paramagnetic resonance spectra of NH<sub>4</sub>Cl are studied as a function of temperature in the phase transition regions of -30.5 and 184.3°C since these transitions have a strong effect on the magnetic relaxation of hydrogen and chlorine nuclei. Bivalent ions of manganese and copper were used as paramagnetic centers. Effects of the lower phase transition were observed on curves for the resonance magnetic field, g-factors and constants of the hyperfine structure of the ions as functions of temperature. No effect attributable to the higher transition were observed, which indicates that rearrangement of the ammonium chloride crystal lattice at this point does not take place close to the paramagnetic center. The authors thank V. F. Koryagin and G. I. Novikova for assistance in the work. Orig. art. has: 2 figures. 44, 55

SUB CODE: <sup>44, 55</sup>07,20/

SUBM DATE: 11May65/

ORIG REF: 001/

OTH REF: 002

Card 1/1 *je*

L 21218-66 EWT(m)/EWP(t) IJP(c) JD

ACC NR: AP6003807 SOURCE CODE: UR/0181/66/008/001/0262/0262

AUTHORS: Zaripov, M. M.; Manenkov, A. A.; Chirkin, G. K.

ORG: Kazan State University im. V. I. Ul'yanov-Lenin  
(Kazanskiy gosudarstvennyy universitet)

46  
B

TITLE: EPR of  $Gd^{3+}$  in  $SrWO_4$

SOURCE: Fizika tverdogo tela, v. 8, no. 1, 1966, 262

TOPIC TAGS: gadolinium, electron paramagnetic resonance, single crystal, strontium compound, crystal symmetry, spin lattice relaxation

ABSTRACT: The authors investigated the EPR spectrum of  $Gd^{3+}$  ions in single crystal  $SrWO_4$  grown by the Verneuil method. The crystals contained ~0.1 atomic per cent paramagnetic ions. The authors found that the  $Gd^{3+}$  ions are in a crystalline field of tetragonal symmetry, the  $c$  axis of which coincides with the  $c$  axis of the crystal. This is evidence of isomorphic substitution of  $Gd^{3+}$  for

Card 1/2

2

L 21218-66

ACC NR: AP6003807

the  $\text{Sr}^{2+}$  ions. The parameters of the spin Hamiltonian of tetragonal symmetry are determined at room temperature and at wave lengths of 8 mm. The relaxation characteristics were measured at 9.4 Gcs by the pulse saturation method. The spin-lattice relaxation time at  $T = 4.2\text{K}$  was the same for all transitions (8 msec) with the field parallel to the z axis. Cross relaxation with a time constant 0.5 msec is observed for all lines. Orig. art. has: 1 formula.

SUB CODE: 20/      SUBM DATE: 29Jul65/

Card 2/2 *da*

*Chirkin G.N.*

**FROLOVA, N.A.**, dotsent; **CHIRKIN, G.N.**, zaslushennyy vrach respubliky.

Registration and analysis of morbidity among workers. Sov.zdrav.  
17 no.5:37-41 My '58. (MIRA 11:5)

1. Iz kafedry organizatsii zdravookhraneniya (zav.- prof.  
B.S. Sigal) Leningradskogo sanitarno-gigiyenicheskogo meditsinskogo  
instituta i mediko-sanitarnoy chasti zavoda imeni OGPU (nach.  
G.N. Chirkin).

(INDUSTRY AND OCCUPATIONS,  
morbidity statist. among workers (Rus))  
(OCCUPATIONAL DISEASES, statistics,  
in Russia (Rus))

SHEVELEV, Maksim Lavrent'yevich; POLYAKOV, N.I., prof., retsenzent; ~~CHIR-~~  
~~KIN, G.S., inzh., retsenzent; DUKHANIN, Yu.A., inzh., red.; BARY-~~  
~~KOVA, G.I., red. izd-va; CHERNOVA, Z.I., tekhn. red.~~

[Safety engineering in the machinery industry] Tekhnika bezopasnosti  
v mashinostroenii. Izd.2., perer.i dop. Moskva, Gos. nauchno-tekhn.  
izd-vo mashinostroit. lit-ry, 1961. 324 p. (MIRA 14:11)  
(Machinery industry—Safety measures)

CHIRKIN, Georgiy Sergeevich; KARTENKO, D.A., red.; NIKOLAYEVA,  
T.D., red. izd-va; YEZHOVA, L.L., tekhn. red.

[Safety engineering and fire prevention measures] Tekhnika  
bezopasnosti i protivopozharnaia tekhnika. Moskva, Vysshiaia  
shkola, 1962. 223 p. (MIRA 15:12)  
(Factories--Fires and fire prevention)  
(Industrial hygiene)

CHIRKIN, Konstantin Ivanovich; CHUGUNOVA, Z.S., red.izd-va; BACHURINA,  
A.M., tekhn. red.

[Tables for calculating the growing stock in forest sections  
(allotments) and its distribution according to the constituent  
(pure) tree species] Tablitsy dlia vychisleniia zapasov na-  
sazhdenii na uchastkakh (vydelakh) i raspredeleniia ikh po so-  
stavliaiushchim (chistym) frevesnym porodam. Moskva, Gosles-  
bumizdat, 1963. 205 p. (MIRA 16:7)  
(Forests and forestry--Tables and ready-reckoners)

I 17510-66 EWT(1)/EEG(k)-2/T/EWA(h) IJP(c)

ACC NR: AP6001807

SOURCE CODE: UR/0107/65/000/012/0035/0036

AUTHOR: Pasynkov, V. (Professor); Chirkin, L. (Candidate of technical sciences); Lototskiy, B. (Engineer); Ckunov, Yu. (Engineer)

ORG: Leningrad Electrotechnical Institute (Leningradskiy elektrotekhnicheskiy institut im. V. I. Lenina)

TITLE: Thin-film negistors and varistors

SOURCE: Radio, no. 12, 1965, 35-36

TOPIC TAGS: varistor, negistor, thin film element

ABSTRACT: Based on the well-known M. A. Lampert, K. L. Chopra, Tiry and other American works, a brief description of semiconductor devices having negative differential resistance is presented. Similar negistors have been developed in the USSR. They have an S-shaped I-V characteristic, throw-over voltages of 1-10 v, maximum currents of 1-20 ma, and differential resistances of 1-100 kohms. Their negative resistance falls off with the increasing ambient temperature and collapses at about 100C. Some details of the preparation of thin films are given. Orig. art. has: 2 figures and 1 table.

SUB CODE: 09 / SUBM DATE: none / ORIG REF: 005

Card 1/19

UDC:

CHIRKIN, L. K.,

L. K. Chirkin, in the paper, "Nonlinear Semiconductor Resistances" described resistances of this type, manufactured of silicone carbide with different binders, gave an explanation of the nonlinear characteristic of the resistances, indicated the technological possibilities of changing characteristics, and enumerated the possibilities of using nonlinear semiconductor resistances as voltage stabilizers, frequency multipliers, etc.

Presented at the Eleventh Scientific and Technical Session of the Leningrad Section VTORiE (Scientific and Technical Society for Radio and Electricity) imeni A. S. Popov, dedicated to the celebration of Radio Day, Leningrad, 16-24 Apr 56.

(Radiotekhnika, No. 7, 1956)

CHIRKIN, L.K., Cand Tech Sci -- (diss) "Non-linear semiconductor resistances and their application." Len, 1958, 10 pp (Min of Higher Education USSR. Len Electrical Engineering Inst im V.I. Ul'yanov (Lenin) ~~Chair of Dielectrics and Semiconductors~~) 100 copies (KL, 27-58, 113)

- 157 -

81356

S/181/60/002/03/10/028  
B006/B017

9.2100

AUTHORS: Pasynkov, V. V., Kholuyanov, G. F., Chirkin, L. K.

TITLE: Dynamic Current-voltage Characteristics of Silicon Carbide Resistors

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 3, pp. 434-437

TEXT: In recent times, the number of low-voltage nonlinear silicon carbide resistors has widely increased; the maximum current densities in these apparatus do not exceed 1 - 2 a/cm<sup>2</sup>. Basing on the same principle the authors produced resistors from green and black silicon carbide, and investigated their dynamic current-voltage characteristics at low current densities by means of an apparatus the circuit of which is shown in Fig. 2. The current-voltage characteristics show essential deviations from the ordinary ones (Fig. 1). Figs. 3a and 3b show typical dynamic characteristics of resistors of green silicon carbide (sample thickness: 1.5 mm, area: 75 mm<sup>2</sup>; natural capacitance: 30 pf). The oscillograms were recorded with pulse durations of 30 and 20 μsec (pulse

Card 1/3

813~~5~~6

Dynamic Current-voltage Characteristics of  
Silicon Carbide Resistors.

S/181/60/002/03/10/028  
B006/B017

height: 138 v). The hysteresis of the characteristics is a result of the natural capacitance of the nonlinear resistor. The succession of the branches of the hysteresis loop was determined by charging and discharging the capacitance of the samples. The hysteresis loop in the initial part of the current-voltage characteristic widened with increasing steepness of the pulse fronts. At low current densities, the microheatings of the contacts between the crystals had no essential influence on the nonlinearity of the resistors. With increasing voltage the resistance of the samples decreases, the influence of natural capacitance decreases as well, and the dynamic current-voltage characteristic approaches the static one. The capacitance of the nonlinear resistors of black and green silicon carbide does not vary within the frequency range 50 kc/s - 25 Mc/s. The dielectric constant of a non-homogeneous resistor material raises the natural dielectric constant of silicon carbide considerably. This phenomenon is connected with the presence of polarizations within the layers of a non-homogeneous material. The capacitance of the nonlinear resistors does not depend on the constant displacement voltages. There are 4 figures and 6 references: ✓

Card 2/3

Dynamic Current-voltage Characteristics of  
Silicon Carbide Resistors

81356  
S/181/60/002/03/10/028  
B006/B017

2 Soviet, 2 French, 1 Swiss, and 1 German.

ASSOCIATION: Leningradskiy elektrotekhnicheskiy institut im. V. I.  
Ul'yanova (Lenina) (Leningrad Electrotechnical Institute  
imeni V. I. Ul'yanov (Lenin))

SUBMITTED: May 11, 1959

4

Card 3/3

28223

S/194/61/000/005/064/078  
D201/D303

9.2100(1153, 1385, 1482)

AUTHORS: Buslovskiy, O.Ye. and Chirkin, L.K.

TITLE: A controlled non-linear four-pole

PERIODICAL: Referativnyy zhurnal. Avtomatika i radioelektronika,  
no. 5, 1961, 10, abstract 5 I73 (Izv. Leningr. elek-  
trotekhn. in-ta, 1960, no. 43, 96-99)

TEXT: The non-linear semiconductor resistor (NSR) exhibits the properties of a controlled element; its dynamic resistance depends on a d.c. bias. A more pronounced effect of control may be obtained when using the NSR as part of a four-pole. An NSR four-pole is described in the form of a bridge, designed in the shape of a disc with four electrodes. The basic parameters of an NSR four-pole are the magnitudes of static resistance at min. and max. values of control voltages at nominal values of supply voltages and current. Since the NSR which constitute the four-pole are not completely identical a certain unbalance of the bridge is observed. A high control

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28223

A controlled non-linear four-pole

S/194/61/000/005/064/078  
D201/D303

efficiency and small bridge unbalance has been obtained with NSR made from ferrous carbide with superfine porcelain as a filter, the suggested NSR four-pole has found practical applications in automation circuits, telemechanics, measurement techniques, as amplitude modulators, d.c. to a.c. converters and phase sensitive discriminators. 3 references. [ Abstracter's note: Complete translation ]

LT

Card 2/2

S/058/62/000/011/048/061  
A160/A101

AUTHORS: Pasyukov, V. V., Chirkin, L. K.

TITLE: The Third Inter-University Conference on the Present State of Di-  
electric and Semiconductor Engineering, 13 - 18 June 1960

PERIODICAL: Referativnyy zhurnal, Fizika, no. 11, 1962, 1, abstract 11-4-1k  
("Izv. Leningr. elektrotekh. in-ta", no. 46, 1961, 348 - 350)

TEXT: The Third Inter-University Conference on the Present State of Di-  
electric and Semiconductor Engineering was held in LETI from 13 to 18 June 1960.  
The conference heard and discussed 178 reports. A total of 1,249 persons, repre-  
sentatives of 34 towns of the USSR and of the east-bloc countries participated  
in it. It is noted that side-by-side with great achievements in the work of  
higher educational institutions on dielectrics and semiconductors, there are se-  
rious deficiencies, especially inadequate work done by higher educational insti-  
tutions in the field of ferrite application. Mentioned in the conference resolu-  
tion was the necessity to increase scientific research work, especially in the  
field of heat-resisting insulation, inorganic polymers, organic semiconductors,

Card 1/2

The Third Inter-University Conference on the...

S/058/62/000/011/048/061  
A160/A101

highly-resistant materials, the reliability of semiconductor devices, and increasing their stability and temperature work range. The conference decided to recommend that the Fourth Conference be called for 1962.

L. Sh.

[Abstracter's note: Complete translation]

Card 2/2

PASYNKOV, Vladimir Vasil'yevich; SAVEL'YEV, Georgiy Anatol'yevich;  
CHIRKIN, Lev Konstantinovich; NASLEDOV, D.N., doktor fiz-  
mat. nauk, prof., retsenzent; SHINKOV, A.D., nauchnyy  
red.; KVOCHKINA, G.P., red.; SHISHKOVA, L.M., tekhn. red.

[Nonlinear semiconductor resistances and their uses]Neli-  
neirye poluprovodnikovye soprotivleniia i ikh primeneniie.  
Leningrad, Sudpromgiz, 1962. 211 p. (MIRA 15:11)  
(Semiconductors) (Electric resistors)

PASYNKOV, V. V., doktor tekhn. nauk, prof.; CHIRKIN, L. K., kand.  
tekhn. nauk

Third Interuniversity Conference on Present Dielectrics and  
Semiconductors Technology. Izv. LETI 59 no.46:348-350 '62.  
(MIRA 15:10)

(Dielectrics—Congresses)  
(Semiconductors—Congresses)

L 2202-66 ENT(1)/T IJP(e) GG

ACCESSION NR: AP5017326

49  
46  
13

UR/0181/65/007/007/2220/2221

AUTHOR: Chirkin, L. K. 55 44

TITLE: Negative differential resistances of silicon carbide crystals 21.44.55

SOURCE: Fizika tverdogo tela, v. 7, no. 7, 1965, 2220-2221, 55

TOPIC TAGS: differential resistance, silicon carbide, silicon diode, volt ampere characteristic

ABSTRACT: The article presents the results of an investigation of the volt-ampere characteristics of silicon carbide crystals with negative differential resistance. Both n-type crystals and p-type crystals (optical diodes) were tested, of 0.2 to 1 mm thickness and 0.5 to 3 mm<sup>2</sup> electrode area. The volt-ampere characteristics of the crystals were investigated at room temperature, using an oscilloscope, at frequencies from 50 cps to several kcs. The two types of volt-ampere curves obtained are shown in Fig. 1 of the Enclosure. The switch-over from the closed to the open state occurred at voltages from 5 to 100 v. The maximum currents in the closed state were 0.1 -- 12 mA. The section with negative differential resistance on the forward branch of the volt-ampere characteristic of the optical diodes is apparently connected with some slow states, since the magnitude of the voltage

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L 2202-66

ACCESSION NR: AP5017326

switch-over decreases with increasing frequency even at audio frequencies. In addition, the switch-over in forward-connected optical diodes is affected by the inverse voltage. Orig. art. has: 2 figures. 3

ASSOCIATION: Leningradskiy elektrotekhnicheskiy institut im. V. I. Ul'yanova  
(Lenina) (Leningrad Electrotechnical Institute)

SUBMITTED: 10Feb65

ENCL: 01

55 44 SUB CODE: 88

NR REF SOV: 004

OTHER: 001

Card 2/3

L 2202-66

ACCESSION NR: AP5017326

ENCLOSURE: 01

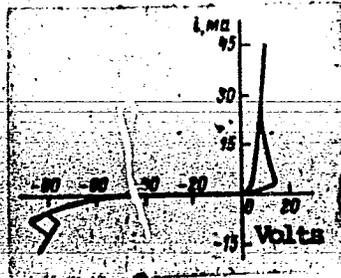
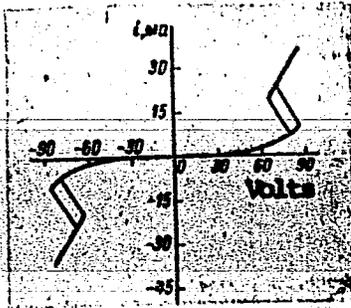


Fig. 1. Volt-ampere characteristics of silicon carbide crystal (left) and optical diode (right).

Card 3/3 DP

L 38856-66 EWT(l)/EWT(m)/T/EWP(t)/ETI IJP(c) JD/JG

ACC NR: AF6018582

SOURCE CODE: UR/0181/66/008/006/1967/1970

AUTHOR: Lototskiy, B. Yu.; Chirkin, L. K.ORG: Leningrad Electrotechnical Institute im. V. I. Ul'yanov (Lenin) (Leningradskiy elektrotekhnicheskiy institut)TITLE: Negative differential resistance due to microheatingSOURCE: Fizika tverdogo tela, v. 8, no. 6, 1966, 1967-1970

TOPIC TAGS: electric resistance, semiconductor device, crystal oscillation, niobium compound, titanium dioxide, relaxation oscillator, harmonic oscillator

ABSTRACT: The authors used the heat balance of a semiconductor with metallic point contact to obtain an analytic expression for its volt-ampere characteristic and the condition under which the differential resistance of the semiconductor is negative. To obtain resistors with negative differential resistance capable of operating at high frequencies, it is necessary to obtain a small thermal time constant. This is done either by using a point contact between the electrode and the semiconductor, or by producing a thin high-resistance region inside the semiconductor. Resistors capable of operating at frequencies of the order of  $10^8$  cps were produced in the form of thin niobium oxide films, (500 - 10,000 Å), in the form of ceramic discs of niobium oxide pressed with clay, and in the form of single crystals of titanium dioxide. In all cases the negative differential resistance was observed only if the condition derived theoretically was satisfied. The resistors with negative differen-

Card 1/2

L 38856-66

ACC NR: AP6018582

0  
tial resistance can be used in oscillators, which produce relaxation oscillations at low frequencies, and sinusoidal oscillations at high frequencies (maximum 10 Mcs). It is indicated that although most authors relate the appearance of negative differential resistance with double injection processes, some experimental facts do not agree with this theory but agree better with the microheating theory. Orig. art. has 2 figures and 7 formulas.

SUB CODE: 20/      SUBM DATE: 12Jan66/      OTH REF: 010

*ms*  
Card 2/2

ACC NR: AF7003648

(N)

SOURCE CODE: UR/0020/67/172/001/0083/0086

AUTHOR: Volokobinskiy, Yu. M.; Lototskiy, B. Yu.; Pasyukov, V. V.; Chirkin, L. K.

ORG: none

TITLE: Thermal processes in thin films

SOURCE: AN SSSR. Doklady, v. 172, no. 1, 1967, 83-86

TOPIC TAGS: semiconducting film, dielectric coating, volt ampere characteristic, thermal effect

ABSTRACT: The authors show that in thin semiconductor and dielectric films, local inhomogeneities of the thermal properties can play an important role and lead in a number of cases to S-shaped or N-shaped volt-ampere characteristics. The effect of thermal inertia of homogeneous semiconductor and dielectric films operated at alternating current on the volt-ampere characteristics is analyzed by expanding in Fourier series the heat flow and the temperature variation in both the film and substrate. The effect of substrate thickness is discussed. The results show that homogeneous films deposited on thick substrates have a larger thermal inertia and even at low frequencies the temperature of the film lags the changes in the heat release. It is shown that materials in which the conductivity decreases with temperature in a certain temperature interval cannot be analyzed by the same procedure as a uniform film. Some experimental results confirming the analysis are presented for  $Al_2O_3$  films. This report was presented by Academician B. P. Konstantinov 10 March 1966. Orig. art. has:

Card 1/2

537:  
UDC: 539.216.22:539.216.22: 536

ACC NR: AP7003648

2 figures and 16 formulas.

SUB CODE: 20/      SUBM DATE: 03Feb66/      OTH REF: 002

Card 2/2

CHIRKIN, M.

Re-equipping factories as a basis for increasing labor productivity. Sots.trud 4 no.8:38-41 Ag '59. (MIRA 13:1)  
(Moscow--Machinery industry)  
(Automation)

I 10971-67 INT(1) SCTB DD/GD

ACC NR: AT6036588

SOURCE CODE: UR/0000/66/000/000/0216/0217

AUTHOR: Komendantov, G. L.; Kompanets, V. S.; Kopanov, V. I.; Poloshchuk, S. I.;  
Banaolov, N. A.; Chirkin, M. D.

ORG: none

TITLE: Further development of the otolithic theory of motion sickness [Paper presented  
at the Conference on Problems of Space Medicine hold in Moscow from 24 to 27 May 1966]SOURCE: Konferentsiya po problemam kosmicheskoy meditsiny, 1966. Problemy kosmicheskoy  
meditsiny. (Problems of space medicine); materialy konferentsii, Moscow, 1966, 216-217TOPIC TAGS: biologic acceleration effect, motion sickness, coriolis acceleration,  
vestibular analyzer, unconditioned reflex, visual analyzer, central nervous systemABSTRACT: The otolithic theory of motion sickness (V. I. Voyachek, 1909-1958) is  
widely recognized. Its basic assumptions are: 1) the universal nature of  
motion sickness (it can arise during any kind of motion); 2) the summation  
of reactions (cumulation) as a mechanism of the development of motion  
sickness; 3) the vestibular, proprioceptive, visual, and cutaneous mechan-  
ical receptors participate in the reflex mechanism of motion sickness de-  
velopment during which, the otolithic component of the vestibular analyzer  
assumes the basic role; 4) the most essential cause of motion sickness is  
vertical displacements of the human body which address otolithic receptors;  
5) the conditioned reflex mechanism of motion sickness is supplementary;  
6) the condition of the nervous system plays an important role in the de-  
velopment of motion sickness; 7) various external conditions (high air tem-  
perature, smells, etc.) influence the development of motion sickness; 8)

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L 10971-67

ACC NR: AT6036588

the resistance of the organism to motion sickness can be built up by repeated exposure to its causative mechanisms (training).

The investigation by the authors led to the establishment of the following: 1) the existence of a phase in the development of motion sickness; 2) a functional fluctuation, the amplitude of which changes as a function of the developmental phase of this condition; 3) an additional mechanism of motion sickness (disrupted systemic function); 4) the development of rocking illusions accompanied by compensatory motor reactions; 5) peculiarities of the course of motion sickness at altitudes of 2000, 3000, 4000, and 5000 m ("elevation" in a pressure chamber); 6) shifts in the excitability and lability of the visual analyzer in the latent form of motion sickness; 7) shifts in atrioventricular conductivity during various phases of motion sickness; 8) the influence of dibazol on the course of the latent form of motion sickness; 9) the inhibition of lifting reflexes (according to EMG data) during the prolonged, standard oscillation of experimental animals and the development of these reactions when the oscillation regimen is altered; and finally, the prospect of applying motion sickness to the discovery of functional insufficiencies, e.g., using conditioned reflex models of motion sickness to reveal statokinetic defects in human subjects. [W.A. No. 22; ATD Report 66-116]

SUB CODE: 06 / SUBM DATE: 00May66

Card 2/2<sup>111</sup>

CHIRKIN, M. I.

Feed Water Purification

Bubbling in deaerator of feed water. Elek. Sta., No. 4, 1952. Inzh. Mosenergo

Monthly List of Russian Accessions, Library of Congress, August 1952. UNCLASSIFIED.

CHIRKIN, M.P.

"On the Calculation of the Sliding of a Viscous Fluid Along Solid Walls" Tr. In-ta Matem. i Mekhaniki An UZ SSR, No 10, Part 2, 1953, 160-178

With the assumption that during flow around a solid wall the particles of a fluid immediately adjacent to the wall have a ~~zero~~ velocity relative to it, the author derives the precise solution of the Navier-Stokes equation for these cases of flow of an incompressible fluid: along a pipe, between two rotating cylinders, between two parallel planes. He also obtains the approximate solution of the equation for the slow rotation of a sphere and for the slow forward motion of a sphere in a fluid. (RZhMekh, No 9, 1955)

CHIRKIN, M. P.

Physical Chemistry

Dissertation: "Some Questions on the Solution and Transfer of Salts." Cand  
Phys-Math Sci, Inst of Mechanics, Acad Sci USSR, 25 Mar 54. (Vechernyaya  
Moskva, Moscow, 15 Mar 54)

SO: SUM 213, 20 Sept 1954

124-58-9-10132

Translation from: Referativnyy zhurnal, Mekhanika, 1958, Nr 9, p 103 (USSR)

AUTHOR: Chirkin, M. P.

TITLE: On the Influence of Facing on the Transport of Salts in Liquids  
(K vliyaniyu ekrana na perenos soley v zhidkostyakh)

PERIODICAL: Tr. In-ta matem. i mekhan. AN Uzbek SSR, 1955, Nr 16,  
pp 121-125

ABSTRACT: A study of the process of salting of the water in a reservoir or a canal, the bottom of which consists of salt (or salty soil). Therein a number of problems are solved for various simplified arrangements of the process under investigation. For all of the arrangements the concentration at the salt surface is assumed to be constant and equal to that corresponding to saturation. The one-dimensional nonstationary and stationary convective diffusion obtaining in the water reservoir (canal) is examined firstly under the following assumptions: 1) The horizontal velocity component of the water flow in the reservoir is zero; 2) the vertical velocity component is constant (it is assumed that this velocity is due to the seepage of the water through the salt); 3) the depth of the reservoir is considered infinite. This

Card 1/3

124-58-9-10132

On the Influence of Facing on the Transport of Salts in Liquids

problem is a particular case of the more general problem for a finite depth of the water or layer of permeable soil examined earlier by the reviewer (Izv. AN SSSR, Otd. tekhn. n. , 1953, Nr 10, pp 1369-1382; RzhMekh, 1955, Nr 9, abstract 5092). The second problem comprises the same case, but in the presence of a facing (embankment), such as a layer of sand of thickness  $h$ , covering the salt. Contrary to the first problem, the examination here extends to the one-dimensional convective diffusion in two media, one in the water filling the canal and the other in the facing material. At the interface between the two media, as usual, the concentration and the state of the diffusion flow are equated. This second problem is examined for the case of stationary diffusion only. In the third problem the study is again focused on the stationary process of the dissolution of the salt in the presence of a facing, but with the addition of a water current in the canal having a constant horizontal velocity. The author disregards the seepage losses from the canal. Hence, so far as the facing layer is concerned, he examines only the free diffusion that occurs in the vertical direction. In the water of the canal the author disregards the existence of any vertical velocity component due to seepage and, in addition, he disregards the diffusion. Thereupon the problem reduces to the examination of the convection of the salt in the canal due to its emergence through the facing. Here the flux of the salt through the facing is linearly dependent on  
Card 2/3

124-58-9-10132

On the Influence of Facing on the Transport of Salts in Liquids

the concentration of the salt on the upper surface of the facing. Eqs. (22) through (25) contain a typographical error: According to Fig. 1 the term  $b$  should be replaced everywhere by  $H$ .

N. N. Verigin

1. Inland waterways--USSR    2. Water--Properties    3. Mathematics--Applications

Card 3/3

CHIRKIN, M.P., dotsent

Some instances of salt transfer. Sbor.nauch.-issl.rab.TTI no.12:241-  
249 '61. (MIRA 15:11)

(Hydraulic engineering) (Salt)

CHIRKIN, M.P.

Critical rate of seepage in convective diffusion of salts,  
Izv. AN Uz. SSR. Ser. fiz.-mat. nauk 8 no.6:38-42 '64.

(MIRA 18:3)

1. Tashkentskiy tekstil'nyy institut.

PEREVERZEV, D.A., kand. tekhn. nauk; CHIRKIN, N.B., inzh.

Study of the nonstationary temperature field of a cooled drum  
rotor of a steam turbine. Teploenergetika 12 no.2:32-35 F '65.  
(MIRA 18:3)

1. Khar'kovskiy filial Instituta mekhaniki AN UkrSSR.

ACC NR: AP5024600

UR/0114/65/000/009/0024/0027  
62-253:536.5.001.5

*23.11.57*  
AUTHOR: Pereverzev, D.A. (Candidate of technical sciences); Provolotskiy, L.V. (Engineer);  
Chirkin, N.B. (Engineer) *23.11.57*

TITLE: Temperature field of a turbine rotor cooled by the passage of vapor through circular channels inside the blade stem

SOURCE: Energomashinostroyeniye, no. 9, 1965, 24-27

TOPIC TAGS: *23.11.57* turbine rotor, temperature distribution, gas flow, turbine blade, turbine cooling, blade cooling

ABSTRACT: The results of the study of the temperature field of the cooled drum rotor of the SKR-100 turbine presented in this paper complete the investigation of the static thermal model of the rotor. The results describe temperature fields in the case of circular channels distributed in such a manner that the rate of outflow from the preceding channels is fully quenched. It is shown that the circular channels in the SKR-100 turbine under investigation produce the same degree of cooling as the elliptic channels within staggered blade distribution used by KhTGZ im. Kirova. *26* In view of the greater technological simplicity of circular channel production as compared with the oval ones, the new approach is recommended for the authors for use in the future design of supercritical turbines (up to 400 at. abs., 700C). The substitution of circular channels does not seem to affect the nonstationary temperature field. Orig. art. has: 6 formulas, 5 figures, and 1 table.

Card 1/2

09010598

L 4547-66

ACC NR: AP5024600

ASSOCIATION: none

SUBMITTED: 00

ENCL: 00

SUB CODE: PR, IE, TD

NO REF SOV: 005

OTHER: 000

Card 2/2

SOV/142-58-4-7/30

AUTHOR: Chirkin, N.M.

TITLE: Dispersion Qualities of Loaded Coaxial Wave Guides (O dispersionnykh svoystvakh nagruzhennykh koaksial'nykh volnovodov)

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy - Radiotekhnika, 1958, Nr 4, pp 430-433 (USSR)

ABSTRACT: The paper examines the dispersion qualities of coaxial wave guides, which are surrounded with lamellae and diaphragms. The results of calculations are given and the experimental investigation of dispersion of wave guides, that are surrounded either with lamellae or diaphragms or with both. The dispersion qualities were examined at a frequency interval, sufficient to fulfill the condition for periodic structural homogeneity. Equations were determined for the various types of wave guides. It was established that in frequencies corresponding to the 2nd/3rd (and so on) pass bands, the energy transmitted through the loaded coaxial waveguide

Card 1/3

SOV/142-58-4-7/30

Dispersion Qualities of Loaded Coaxial Wave Guides

concentrates especially at the segment boundary and the unloaded conductor has only a weak effect on wave propagation. This law is valid also for the second wave guide. Comparison of the computations leads to the conclusion that the same dispersion characteristics can be obtained by both types of delay assemblies but the cross sections of the coaxial wave guide, surrounded with diaphragms, must be greater than the cross sections of a coaxial wave guide with lamellae. To explain the role of the free wave guide, the author investigated the dispersion qualities of a model of a coaxial wave guide, both conductors of which were loaded. The paper states that replacing the inner wave guide by a rod with lamellae changes considerably the dispersion qualities of coaxial wave guide loaded with diaphragms. The wave guide thus obtained is characterized by weak dispersion and greater pass band width. In this way, a coaxial wave guide with loaded conductors is a broad band delay system with weak dispersion that can scatter a large RF power. All delay systems used in power

Card 2/3

Dispersion Qualities of Loaded Coaxial Wave Guides SOV/142-58-4-7/30

travelling-wave tubes must have these qualities. A wide variety of dispersion characteristics can thus be obtained by suitable selection of the geometric dimensions of loaded coaxial wave guides. There are 5 graphs, 1 diagram and 6 references, 3 of which are Soviet and 3 English.

ASSOCIATION: Kafedra radiotekhnicheskoy elektroniki Taganrogskogo radiotekhnicheskogo instituta (Chair of Radio and Electronic Engineering, Taganrog Radio Engineering Institute)

SUBMITTED: October 31, 1957 (initially)  
and February 3, 1958 (after revision)

Card 3/3

06353  
SOV/142-2-4-6/26

9 (2, 9)

AUTHORS:

~~Chirkin, N.M., Lyamov, V.Ye.~~

TITLE:

The Calculation of Periodically Loaded Wave Guides By the Equivalent Circuit Method

PERIODICAL:

Izvestiya vysshikh uchebnykh zavedeniy, Radiotekhnika, 1959, Vol 2, Nr 4, pp 424-430 (USSR)

ABSTRACT:

The authors discuss an equivalent circuit of a diaphragm-type waveguide delay system for the wave E<sub>01</sub>. A simple method is suggested for calculating the dispersion of periodically loaded waveguides. One of the possibilities which are encountered when determining the equivalent parameters of such waveguides. The method of the characteristic wavelength does not require any graphic plotting and is reduced to some simple arithmetic calculations. The accuracy of this method is adequate for practical purposes. The coincidence of results obtained with this method with those found in literature confirms the correctness of the assumptions

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AUTHOR: Chirkin, N.M.

SOV/109-4-1-16/30

TITLE: On the Problem of the Scattering Properties of a Coaxial Waveguide Whose Both Conductors are Disc-loaded  
(K voprosu o dispersionnykh svoystvakh koaksial'nogo volnovoda, oba provodnika kotorogo nagruzheny diskami)

PERIODICAL: Radiotekhnika i Elektronika, 1959, Vol 4, Nr 1,  
pp 126 - 127 (USSR)

ABSTRACT: In two works by R.G. Mirimanov and G.I. Zhileyko (Refs 3 and 4), it was pointed out that a disc-loaded waveguide of the type similar to that shown in the figure on page 126 of the journal could be employed as a slow-down system in travelling-wave tubes. Since the problem was not discussed in detail, it was decided to carry out an investigation in order to determine the properties of such waveguides. The experimental models prepared for the investigation had the following dimensions:  
 $2b = 100 \text{ mm}$ ,  $2r_0 = 10 \text{ mm}$ ,  $L = 5 \text{ mm}$  and  $\delta/L = 0.1 \text{ mm}$ ;  
the dimensions  $2a$  and  $2c$  were different for different samples. The slow-down characteristics of the waveguides were estimated on the basis of their phase velocity curves

Card1/2

SOV/109-4-1-16/30

On the Problem of the Scattering Properties of a Coaxial Waveguide  
Whose Both Conductors are Disc-loaded

as a function of the applied wavelength  $\lambda_0$ . The results are shown in the figure on p 126, where Curve I characterises the scattering of a waveguide having  $2c = 40$  mm, and  $2a = 30$  mm; Curve III gives the characteristic of a sample in which  $2a = 2r_0 = 30$  cm, while Curve II describes the properties of a waveguide in which  $2c = 70$  mm and  $2a = 62$  mm. From these results, it is concluded that the transverse dimensions of the discs determine not only the magnitude of the slowing down, but also the character of scattering of the waveguide. At frequencies corresponding to comparatively short waves, the scattering is more pronounced than at longer wavelengths. The author makes acknowledgment to Yu.G. Stadnik for his help in carrying out the experiments. There are 2 figures and 7 references, 5 of which are Soviet and 2 English.

SUBMITTED: May 4, 1958

Card 2/2

AUTHOR: Chirkin, N.M.

SOV/109-4-7-16/25

TITLE: The Problem of the Dispersion Characteristics of a Coaxial Waveguide with a Helical Groove on its Inner Conductor

PERIODICAL: Radiotekhnika i elektronika, 1959, Vol 4, Nr 7, p 1200 (USSR)

ABSTRACT: The waveguide is illustrated in the figure. Its characteristics were measured experimentally and the results are also shown in the figure. Curves 1 and 2 of the figure refer to waveguides having  $D = 7$  and  $12$  mm, respectively. The remaining parameters of the waveguides were as follows:  $d = 2$  mm;  $a = 18$  mm,  $b = 16$  mm and  $g = 2$  mm. There is 1 figure.

SUBMITTED: September 27, 1958

Card 1/1

66709

SOV/109-4-8-30/35

9.1300

AUTHORS: Chirkin, N.M. and Lyamov, V. Ye.

TITLE: Inter-dependence Between the Dispersion Characteristic and the Magnitude of the Coupling Impedance in Waveguides with Periodic Structures

PERIODICAL: Radiotekhnika i elektronika, 1959, Vol 4, Nr 8, pp 1397 - 1398 (USSR)

ABSTRACT: The coupling impedance in electron tubes with periodic structures can be determined from:

$$R_m = \frac{E_{z,m}^2}{2\beta_m^2 P} \quad (1)$$

On the other hand, the power produced in the system is given by (Ref 2):

$$P = v_{gp} \frac{W}{D} \quad (2)$$

where  $v_{gp}$  is the group velocity. This can be defined

Card1/3

66709

SOV/109-4-8-30/35

Inter-dependence Between the Dispersion Characteristic and the Magnitude of the Coupling Impedance in Waveguides with Periodic Structures

by Eq (3). On the basis of Eqs (1)-(3), the coupling impedance can be expressed as:

$$R = \frac{E_z^2}{8\pi^2} - \frac{1}{c} \frac{D}{\eta W} \left( 1 - \frac{\lambda}{\eta} \frac{d\eta}{d\lambda} \right) \lambda^2 \quad (4)$$

where  $\eta = c/v_{\phi} = \lambda/\Lambda$ , where  $\Lambda$  is the delay coefficient. The remaining symbols in Eq (4) are as follows:

- $E_z$  is the amplitude of the longitudinal component of the electric field;
- $D$  is the period of the waveguide;
- $W$  is the energy stored in a section having a length  $D$  and
- $v_{\phi}$  is the phase velocity. 4

Card 2/3